CAEN
Nuclear Division

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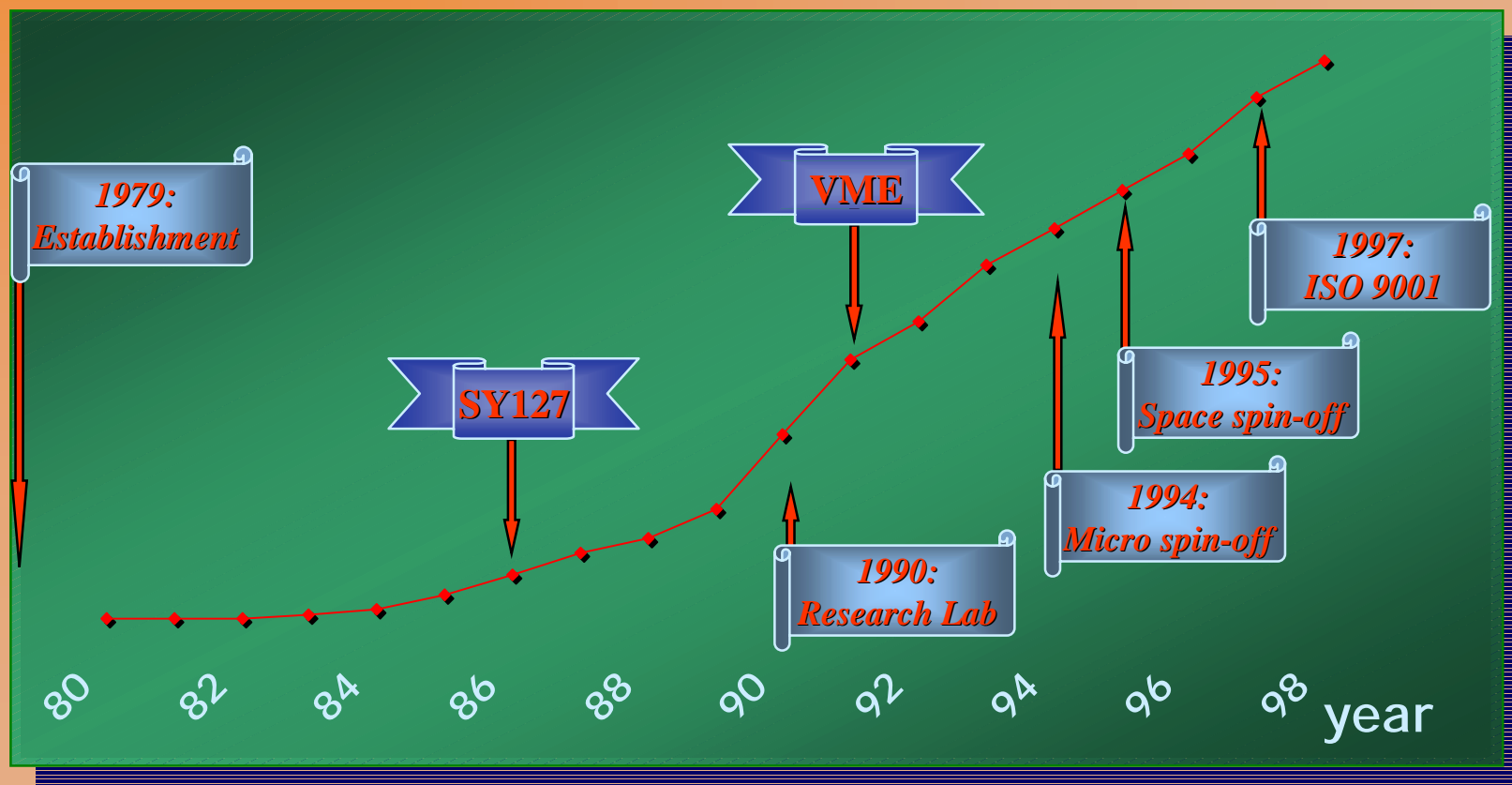
BTeV Meeting FNAL, April 2001

Background

- Established in 1979 by a group of senior engineers from INFN

- Deep experience in the field of Nuclear Physics electronics:
  - laboratory development
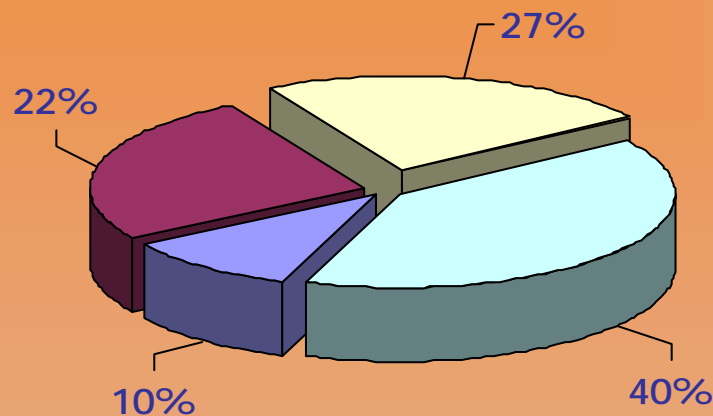 - experimental site problems

Main activities

- Design and production of electronics for Nuclear and Subnuclear experiments:
  - *HV/LV power supply systems*
  - *front-end electronics*

- Research & Development for the other CAEN spin-off activities

- Sales Representative of electronic equipment by other firms (Crates, Processors, PM Tubes)
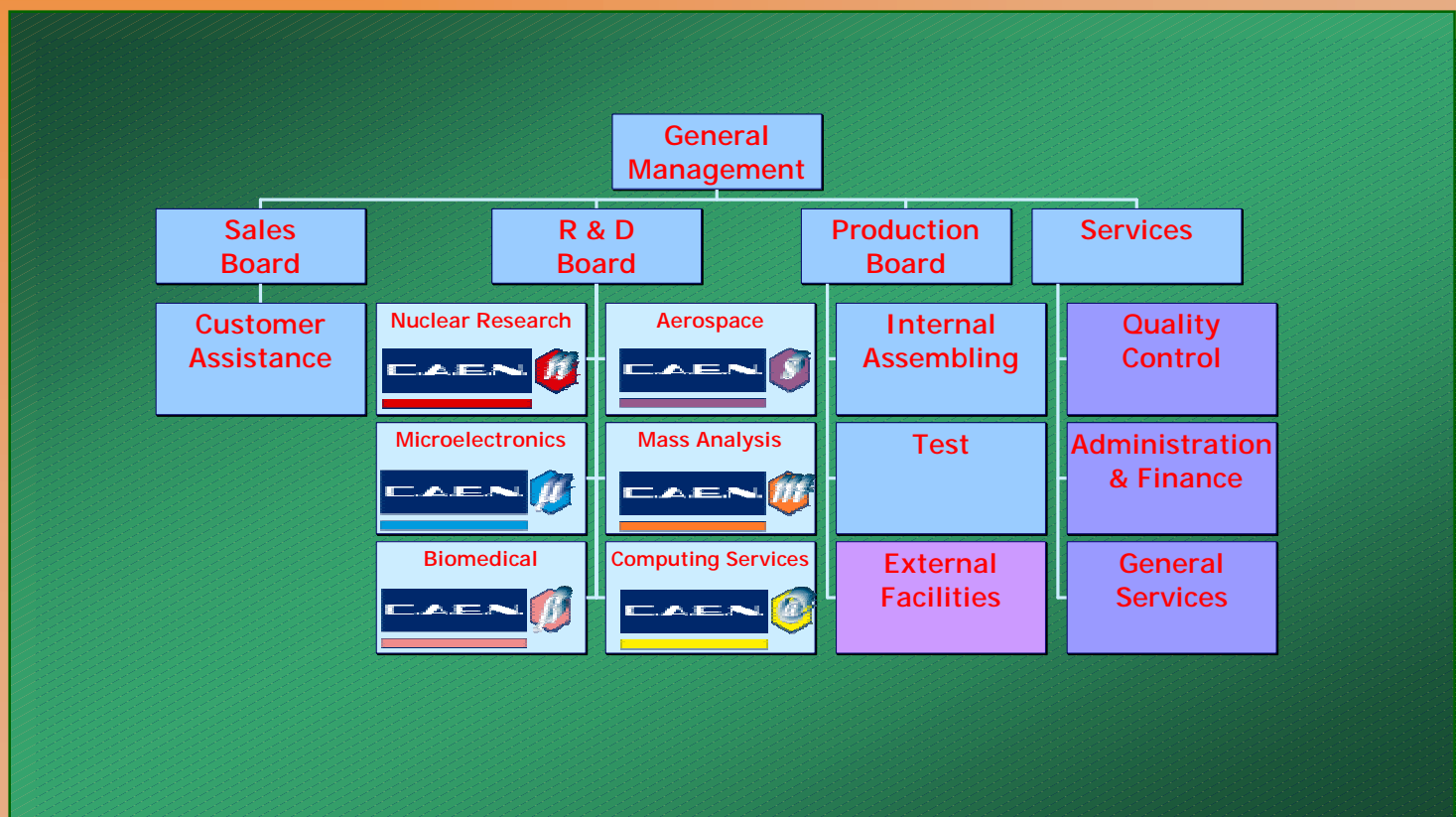
Milestones

1979:
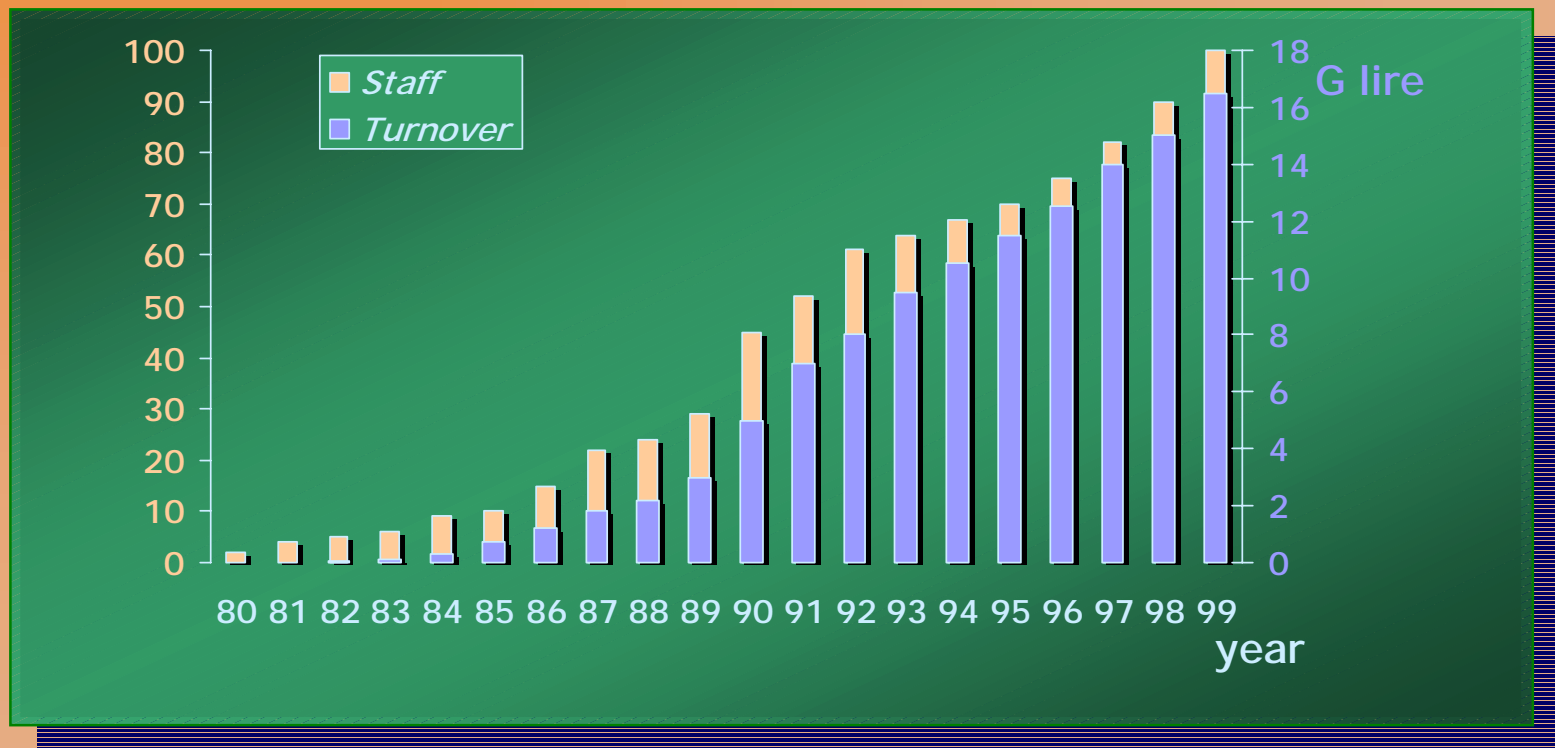Establishment

SY127

VME

1990:
Research Lab

1994:
Micro spin-off

1995:
Space spin-off

1997:
ISO 9001

80   82   84   86   88   90   92   94   96   98   year

CAEN Staff

Legend	
▣ Sales	▣ Test
▣ Services	▣ R&D

- **Staff:**
  - 84 people
    (production not included)

- **Staff background:**
  - 40 University degree
  - 39 Technical High School diploma
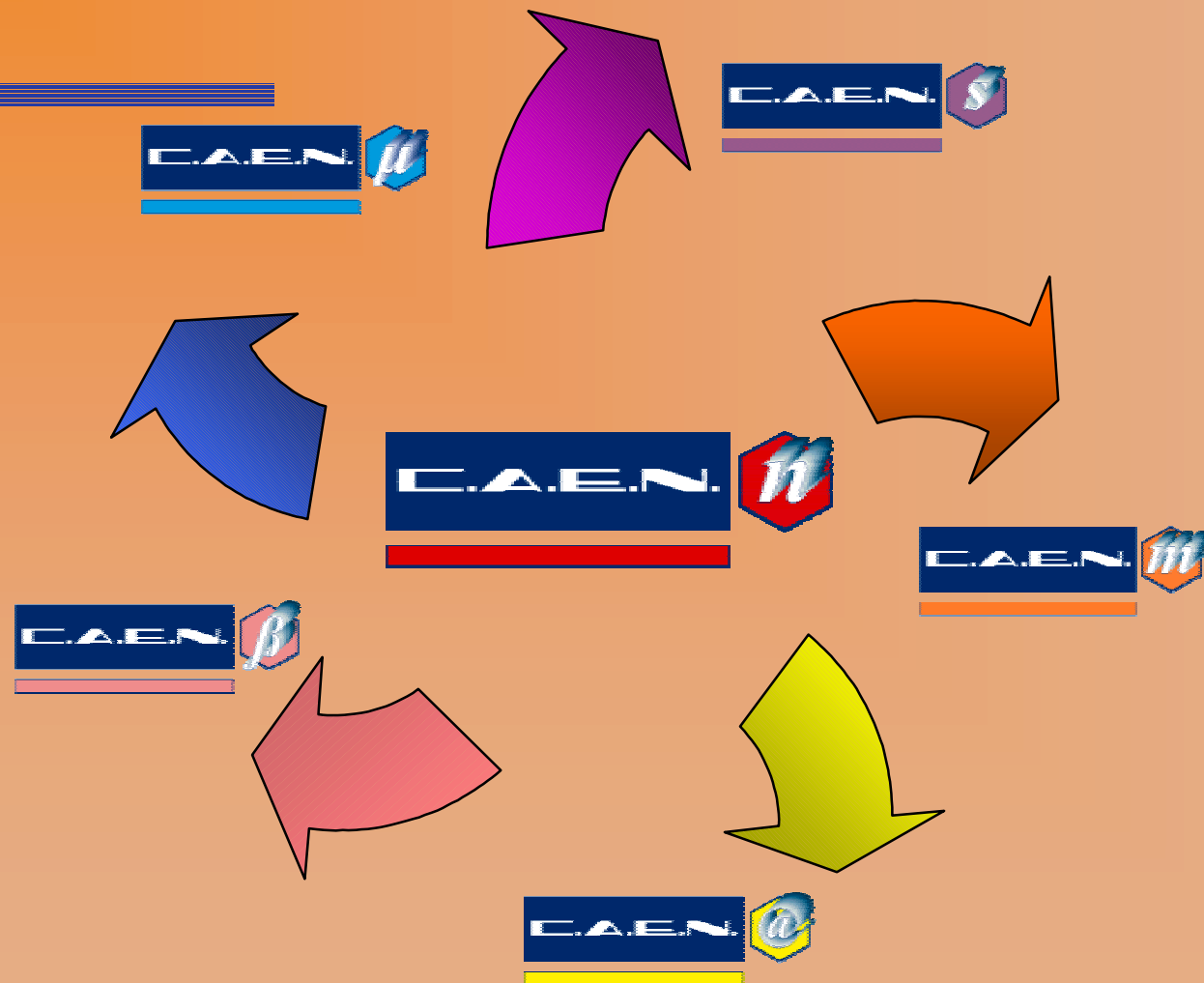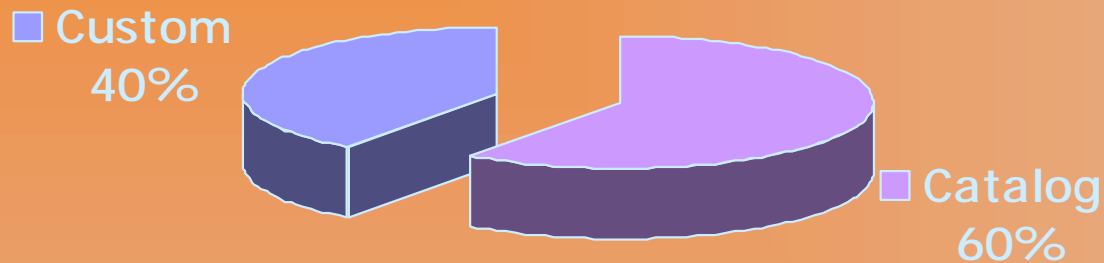 - 5 Technicians

CAEN organigram

CAEN turnover

CAEN spin-offs

Turnover share

Custom 40%

Catalog 60%

- significant fraction of custom developments
- close collaborations with researchers

HV/LV products

Power supply devices for all the detectors
and Front end electronics used in HEP:

- *Photomultiplier tubes*
- *Wire Chambers*
- *semiconductor detectors (pixel, strips)*
- *Resistive Plate Chambers*
- *front end electronics*
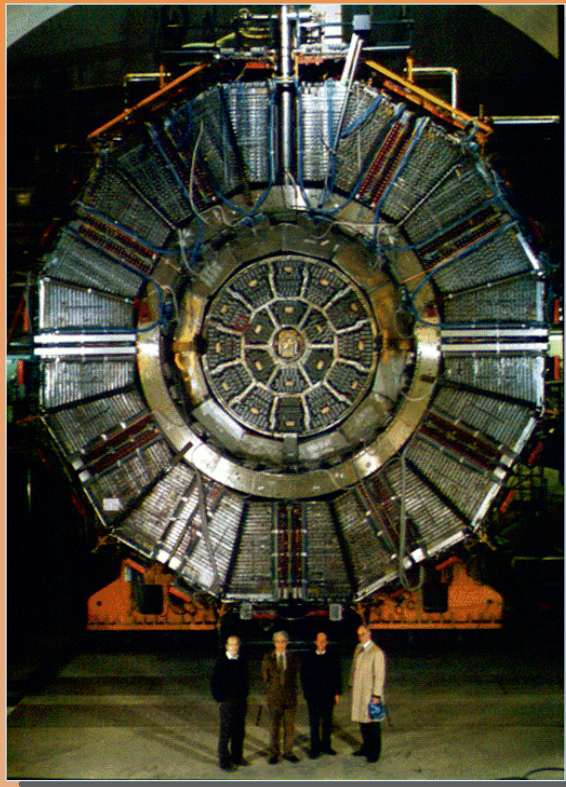
Both NIM and CAEN standards

Latest power supply developments

- – *SY1527: a new power supply system for LHC experiments*
- – *SY900: a floating power supply for electron spectroscopy applications*

Major projects with CAEN power supplies

- *ALEPH, OPAL DELPHI, L3 (CERN)*
- *ZEUS, HERA-B (DESY)*
- *KLOE (FRASCATI)*
- *CDF (FERMILAB)*
- *BABAR (SLAC)*
- *SUPERKAMIOKANDE (JAPAN)*
- *PAMELA, AMS (Space)*
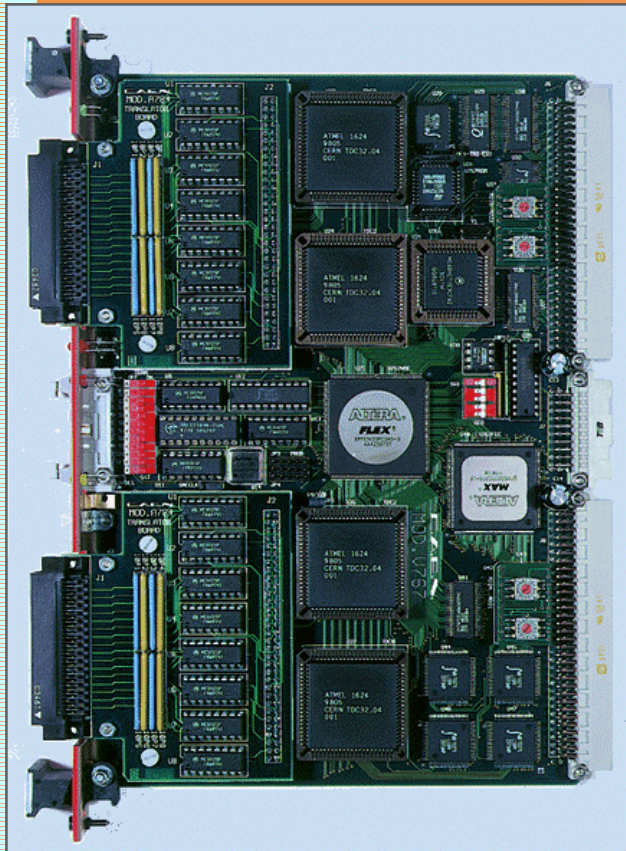- *OTHER CERN EXPERIMENTS*

Front End products

Electronic devices for the readout of signals coming from detectors used in HEP:

- *Amplifiers*
- *Analog to Digital Converters (Charge, Time, Peak)*
- *Discriminators*
- *Timing Units*
- *Scalers*
- *Coincidence/Logic Units*
- NIM, CAMAC and VME standard
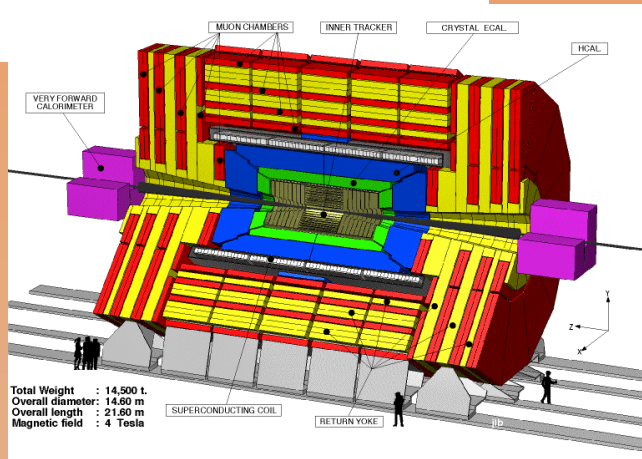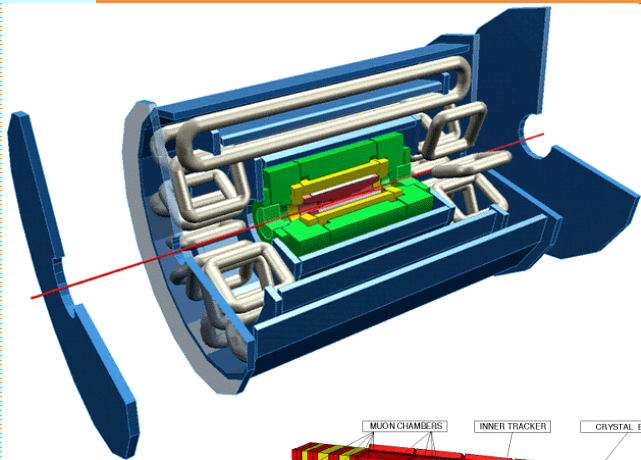
Latest front end developments

- *VME 6U format*
  - *32 channel Analog to Digital converters (Charge, Peak, Time)*
  - *128 channel Multihit TDC (based on CERN chip)*
  - *16 channel discriminators*
- *CAMAC format*
  - *16 channel discriminators*

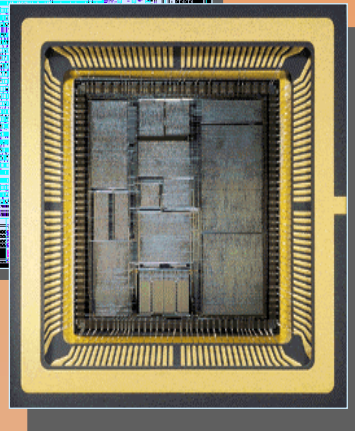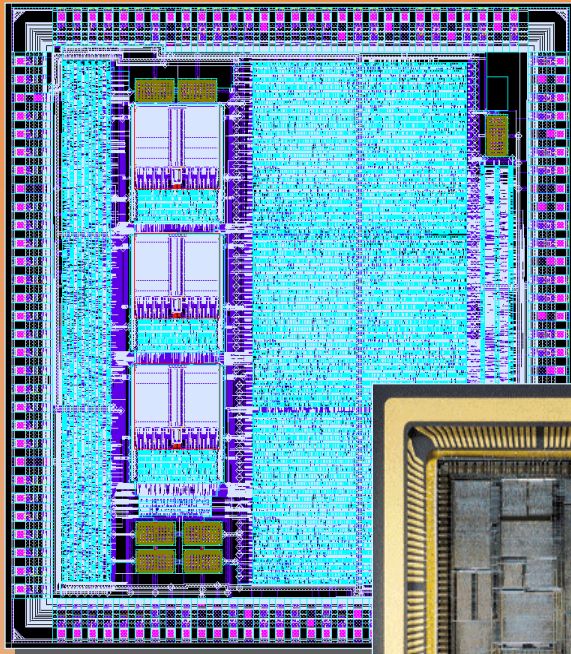# Major projects with CAEN front end

- *ALEPH, OPAL DELPHI, L3 (CERN)*
- *ZEUS, HERA-B (DESY)*
- *MACRO (Gran Sasso)*
- *KLOE (Frascati)*
- *ICARUS (Gran Sasso)*
- *OTHER CERN EXPERIMENTS*

Future developments

- **Collaborations with new LHC experiments at CERN (ALICE, ATLAS, CMS, LHCB)**
  - *HV/LV power supplies*
  - *Front End Electronics*
- **Official involvements with italian INFN projects**

Total Weight : 14,500 t.
Overall diameter : 14.60 m
Overall length : 21.60 m
Magnetic field : 4 Tesla

MUON CHAMBERS   INNER TRACKER   CRYSTAL ECAL
HCAL
VERY FORWARD CALORIMETER
SUPERCONDUCTING COIL   RETURN YOKE
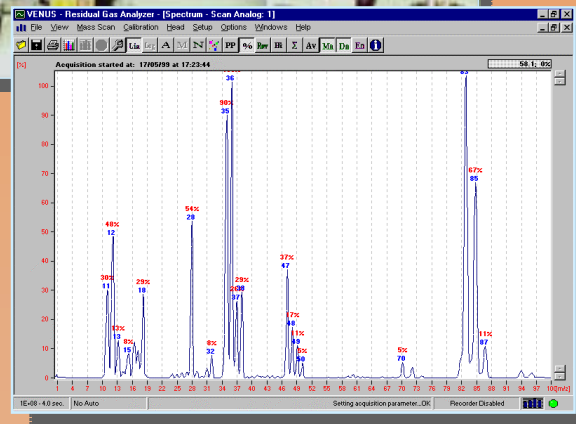
CAEN Microelectronics

- Digital, Analogue and Mixed-Signal system design
- Space, Nuclear Physics and Biomedical applications

  - Well defined project and design flow
  - Close relationship with several foundries, test- and assembly-houses

CAEN Mass Analysis

(VENUS Residual Gas Analyser and vacuum measurement instrumentation)

- **High quality, cost-effective products:**
  - *vacuum meters*
  - *mass spectrometers*
  - *residual gas analysers*

- **Custom systems for specific environmental applications**
- **Application-dedicated software**

CAEN Aerospace

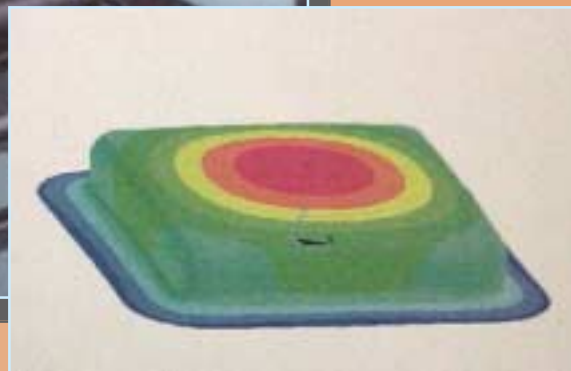*(INTEGRAL/JEM-X*
High Voltage Power Supply)

- Design and development of custom power supply and front-end electronics

- ESA standard certified personnel, testing facilities

- Catalog products

  - COTS component evaluation

  - International Projects:

    – WIZARD   –   PAMELA

    – AMS-STS91   –   AGILE

    – INTEGRAL/JEM-X –   AMS-ISSA

BTeV Meeting FNAL, April 2001
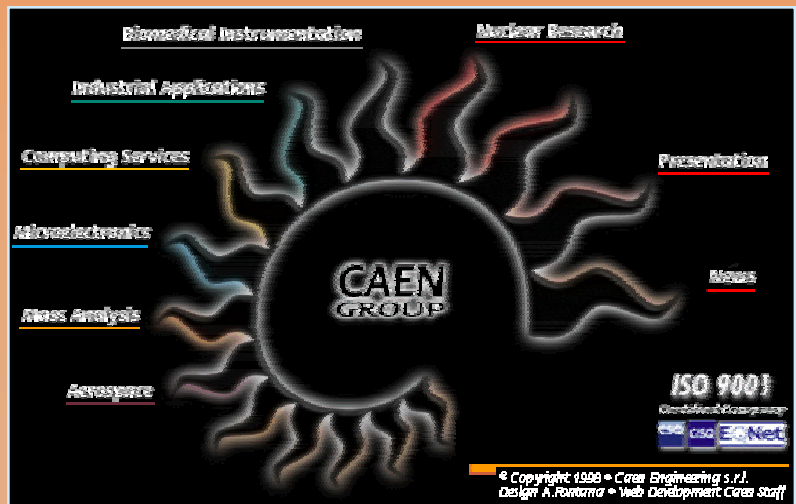
CAEN Biomedical

- Product line for the remote monitoring of clinic parameters:
  - Blood pressure
  - oxygen therapy
  - oxygen saturation
  - ECG
  - CO_2
  - Posture
- Mobile cardiographic imaging system

- Scintimammography for tumor precocious detection

CAEN Computing Services

- In-house system firmware development
- Automation/control applications
- Intranet-based solutions

- Internet services
- WEB design
- E-commerce solutions